MOBILE TERMINAL HAVING DETACHABLE SUB-MODULE

CROSS REFERENCE TO RELATED APPLICATION

[0001] This application claims priority from and the benefit of Korean Patent Application No. 10-2009-0013319, filed on Feb. 18, 2009, which is hereby incorporated by reference for all purposes as if fully set forth herein.

BACKGROUND OF THE INVENTION

[0002] 1. Field of the Invention

[0003] Exemplary embodiments of the present invention relate to a mobile terminal and, more particularly, to a mobile terminal having a detachable sub-module.

[0004] 2. Discussion of the Background

[0005] Generally, a mobile terminal is an electronic device for enabling a user to use a function such as wireless communication, network connection, and digital broadcasting reception almost regardless of time and location. Presently, mobile terminals perform various functions such as communication, document writing, game playing, photographing, digital broadcast reception, moving picture reproduction, and internet web browsing. However, mobile terminal sizes are decreasing, creating limitations in performing such various functions. For example, in order to support a photographing function, a mobile terminal has a camera unit with fewer pixels relative to a general digital camera and thus has limited resolution when photographing an image. When a higher resolution camera unit for supporting higher quality photography is mounted in a mobile terminal in order to overcome this limitation, the size of the mobile terminal increases, lessening the portability of the mobile terminal. In order to perform various functions using the mobile terminal, various function modules mounted within the mobile terminal are limited in performing the functions. Therefore, a mobile terminal that is portable while supporting various functions such as a camera function is desired.

SUMMARY OF THE INVENTION

[0006] Exemplary embodiments of the present invention provide a mobile terminal that is portable and supports various functions of the mobile terminal by coupling a sub-module that performs a function of the main terminal, which is equipped with a display unit.

[0007] Additional features of the invention will be set forth in the description which follows, and in part will be apparent from the description, or may be learned by practice of the invention.

[0008] Exemplary embodiments of the present invention disclose at least one sub-module comprising a sub-function configuration unit having parts to perform a function and a main terminal comprising a display unit on a front surface and a connection unit on a rear surface with the connection unit having a first feature adapted to detachably receive the sub-module.

[0009] Exemplary embodiments of the present invention also disclose a mobile terminal having a sub-module comprising a sub-function configuration unit comprising parts to perform a function and a main terminal comprising a display unit at a front surface of the main terminal and a connection unit at a rear surface of the main terminal, the connection unit to detachably couple the sub-module to the main terminal, wherein a magnet is installed at a side surface of the connection unit or the sub-module, and the magnet detachably couples the sub-module to the main terminal.

[0010] It is to be understood that both the foregoing general description and the following detailed description are exemplary and explanatory and are intended to provide further explanation of the invention as claimed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] The accompanying drawings, which are included to provide a further understanding of the invention and are incorporated in and constitute a part of this specification, illustrate exemplary embodiments of the invention, and together with the description serve to explain the principles of the invention.

[0012] FIG. **1** is a perspective view showing a configuration of a mobile terminal having a detachable sub-module and two sub-modules according to exemplary embodiments of the present invention.

[0013] FIG. **2**A and FIG. **2**B show a front surface and a rear surface of a main terminal in the mobile terminal having a detachable sub-module.

[0014] FIG. **3** is a block diagram showing a control circuit of the mobile terminal having a detachable sub-module.

[0015] FIG. **4** is a view showing an exemplary embodiment of using only a main terminal of the mobile terminal having a detachable sub-module.

[0016] FIG. **5**A is a view showing a camera module as an exemplary embodiment of a sub-module in the mobile terminal having a detachable sub-module.

[0017] FIG. **5**B is a perspective view showing an exemplary embodiment in which a camera module is mounted in a connection unit of a main terminal in the mobile terminal of FIG. **1**.

[0018] FIG. **5**C is a view showing an exemplary embodiment of manipulating a camera module through a main display unit in the mobile terminal of FIG. **1**.

[0019] FIG. **6**A is views of an exemplary embodiment showing a beam projector module as a sub-module in the mobile terminal having a detachable sub-module.

[0020] FIG. **6**B is a view of an exemplary embodiment showing beam projector module mounted in a connection unit of a main terminal in the mobile terminal of FIG. **1**.

[0021] FIG. **6**C is a view of an exemplary embodiment showing manipulation of a beam projector module through a main display unit in the mobile terminal of FIG. **1**.

DETAILED DESCRIPTION OF ILLUSTRATED EMBODIMENTS

[0022] The invention is described more fully hereinafter with reference to the accompanying drawings, in which exemplary embodiments of the invention are shown. This invention may, however, be embodied in many different forms and should not be construed as limited to the exemplary embodiments set forth herein. Rather, these exemplary embodiments are provided so that this disclosure is thorough, and will fully convey the scope of the invention to those skilled in the art. In the drawings, the size and relative sizes of layers and regions may be exaggerated for clarity. Like reference numerals in the drawings denote like elements.

[0023] It will be understood that when an element or layer is referred to as being "on" or "connected to" another element or layer, it can be directly on or directly connected to the other